

Creating Drive/Part Operations

I-DEAS™ Tutorials: Milling Projects

In this tutorial, you'll create drive/part operations. For drive/part operations, the tool contacts two surfaces, instead of one. The tool moves along part surfaces while staying in contact with drive surfaces.

Learn how to:

- pick simple drive and part surfaces
- pick complex drive and part surfaces

Before you begin...

Prerequisite tutorials:

- all tutorials under the Modeling Fundamentals menu
- Introduction to Generative Machining
- Building a Setup Assembly
- Generating In-process Stock and Checking Validity
- Working with Tools and Tool Catalogs
- Picking Holes
- Setting Machining Parameters for Hole-making Operations

The file you need for this tutorial is distributed with the product. You must copy it into your local directory.

Move to the local directory where you want to copy the file. Then:

In UNIX:


```
cp $SDRC_INSTL/examples/nc/tut_drivepart.arc .
```

In Windows use:

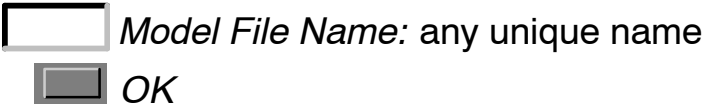
```
copy %SDRC_INSTL%\examples\nc\  
tut_drivepart.arc .
```

If you can't copy the file, you may have to set up the variable needed to copy from the I-DEAS installation.

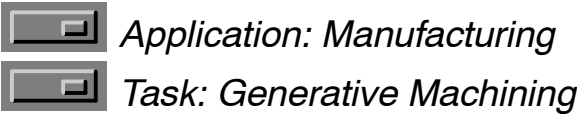
```
. sdrcl_oadev
```

 If you can't access the file, contact your system administrator. The file may not be installed.

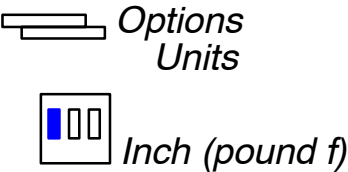
If you did not start I-DEAS with a new (empty) model file, open a new one now and give it a unique name.



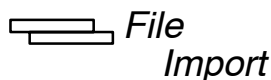
Make sure you're in the following application and task:



Set your units to inches.



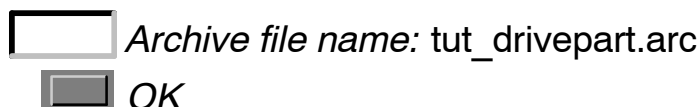
Import the archive file that contains the parts and tools that you need to complete this tutorial. Importing an archive file can take several minutes. Be patient.



Import Selections form



File Name Input form



The Manufacturing application quits, an informational message is displayed (the message will dismiss automatically), and the archive file is imported.

Import Archive File Status

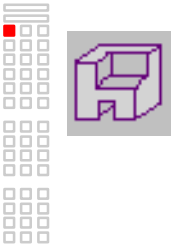


Be sure to check the List region to be sure that the parts imported properly.



A second informational message is displayed (the message will dismiss automatically) and the Manufacturing application starts.

Create a job.



NC Job Create form

Job Name: Milling Drive and Part Surfaces

OK

Add the part to the job.



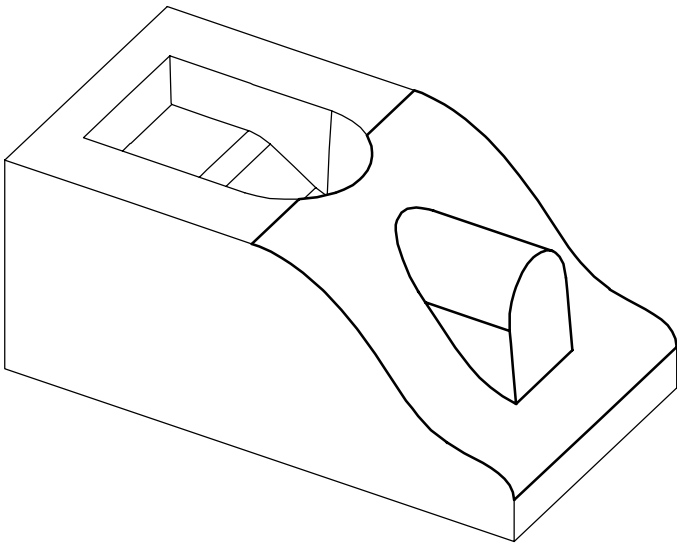
Get

From Bin/Library

Select Part/Assembly form

tut_boss

OK



The part is located relative to the global-space coordinate system with the origin at the center of the workplane. You can view the global-space coordinate system by picking *Workplane Appearance...*, then toggling on *Display Origin* on the *Workplane Attributes* form.



Recovery Point

 *File
Save*

Warning!

If you're prompted by I-DEAS to save your model file, respond:

 *No*

Save only when the tutorial instructions tell you to—not when I-DEAS prompts for a save.

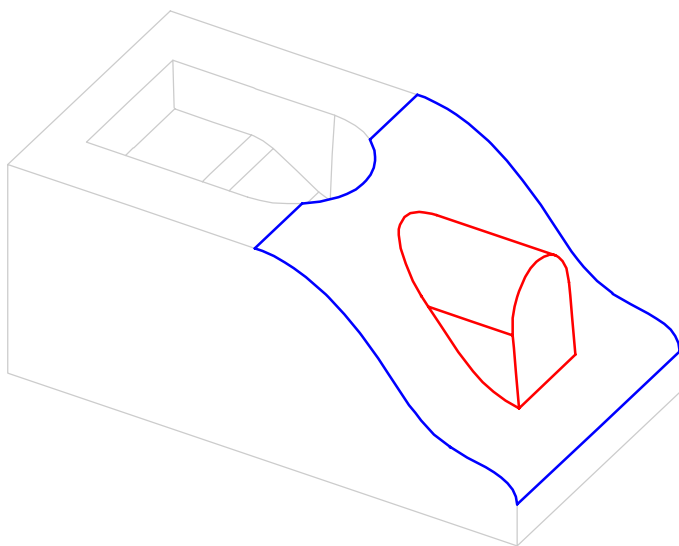
If you make a mistake at any time between saves and can't recover, you can reopen your model file to the last save and start over from that point.

Hint

To reopen your model file to the previous save, press Control-Z.

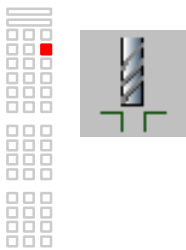
When defining a drive/part operation, you pick all the drive surfaces, and then all the part surfaces. The tip of the tool stays in contact with the part surfaces, and the side of the tool stays in contact with the drive surfaces. The first drive surface and first part surface you select become the seed surfaces.

In the following steps, you'll pick a single part surface and multiple drive surfaces. This simple set of part and drive surfaces will show you how to guide the tool.





What: Create a drive/part operation.


How:




Operation Selection form

 *Category: Milling*

 *Type: Drive/Part*

 *Create*

 Don't close the Operation Specification form.

What: Name the operation, and then pick the part and drive surfaces around the boss.

How:

Operation Specification form

Name: 3D profile around boss



 Don't close the Surface Selection form.

What: Pick the drive surfaces around the boss.

How:

Surface Selection form



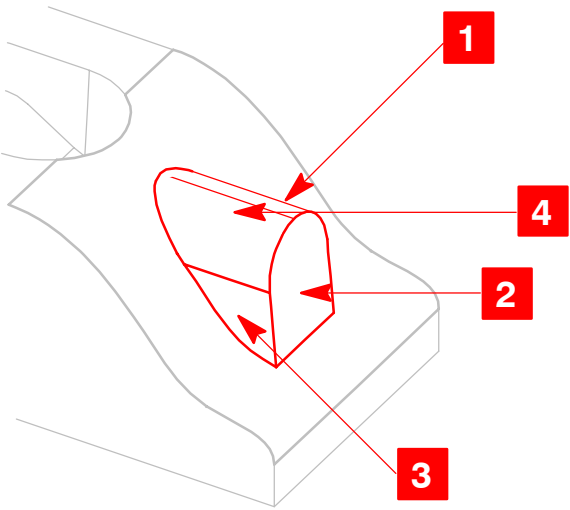
Shift-pick the drive surfaces F1, F2, F3, and F4.


1 F1

2 F4

3 F2

4 F3



 Don't close the Surface Selection form.

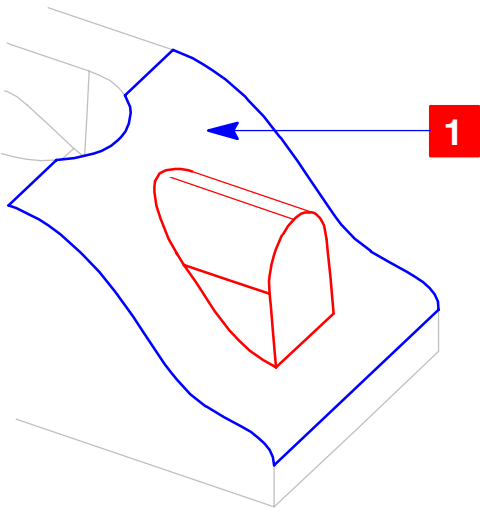
What: Pick the part surface around the boss.


How:

Surface Selection form



1 pick the part surface (F15)



 Don't close the Operation Specification form.

What: Use a 1/2” diameter ball mill to machine the surfaces.

How: You’ll open the project supplied with the software for this example.

Operation Specification form



Cutting Tool Specification—Mill form



Item Selection form



1/2” dia ball mill



 Don't close the Cutting Tool Specification–Mill form.

What: Adjust the *Holder To Tip Dist* and the *Max Depth Of Cut* so that the holder clears the part.

How: Change the *Identifier* to create a new tool. Then specify the values for the parameters.

Cutting Tool Specification—Mill form

Identifier: 1/2” dia ball mill modified

Press the Tab key to advance to the next field.


I-DEAS Warning

OK

Holder To Tip Dist: 4

Max Depth Of Cut: 3

OK

 Don't close the Operation Specification form.

What: Specify a ramp entry. You use a ramp entry when the selected surfaces are not planar and the tool must enter tangent to the first cut motion. For drive/part operations, the tool avoids gouging the part automatically.

How:

Operation Specification form



Machining Parameters: Cut form



Entry...

Machining Parameters: Entry form




Engage Plane: 1



Sink Angle: 60




 Don't close the Machining Parameters: Entry form.

What: Define the start point for the toolpath by measuring between two vertices.

How:

Machining Parameters: Entry form

 *Start Near* (turn on)

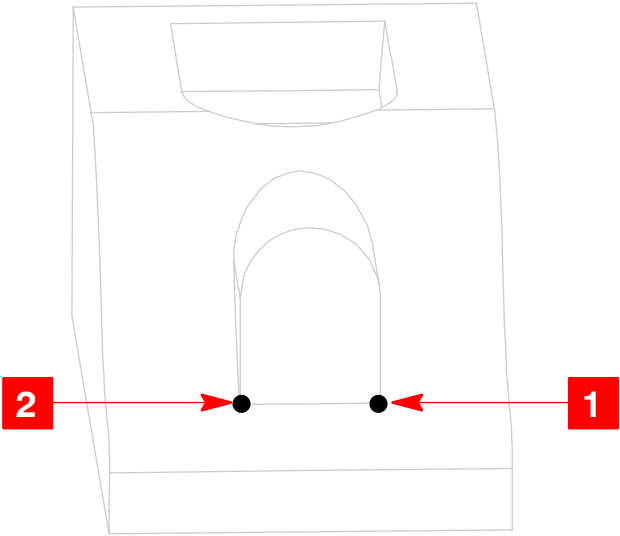
 *Pick Start Point* (next to *Start Near*)


 *User Defined Point*


 *Between*

1 V2

2 V4



 (accept the 50% between default)

 Don't close the Machining Parameters: Entry form.

What: Specify a ramp exit.

How:

Machining Parameters: Entry form



Entry...
Exit...

Machining Parameters: Exit form



Exit Type: Ramp



Retract Plane: 0.5




Angle: 90



Lift Angle: 60



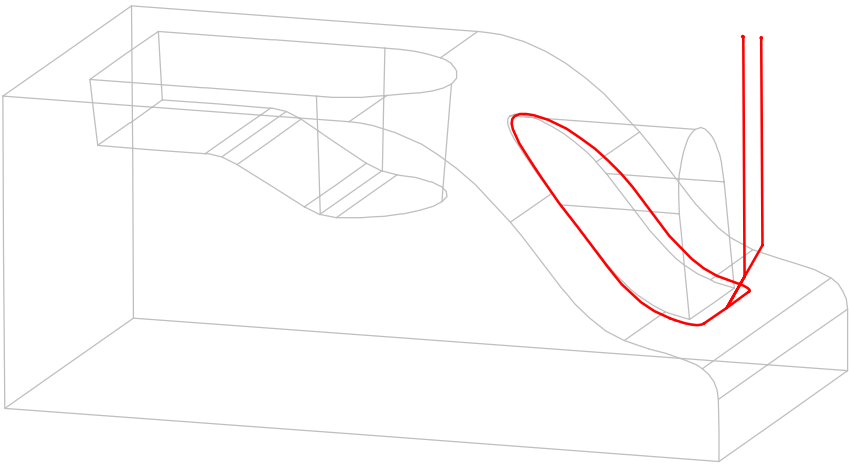
OK

 Don't close the Operation Specification form.

What: Generate the toolpath.

How:

Operation Specification form



Things to notice

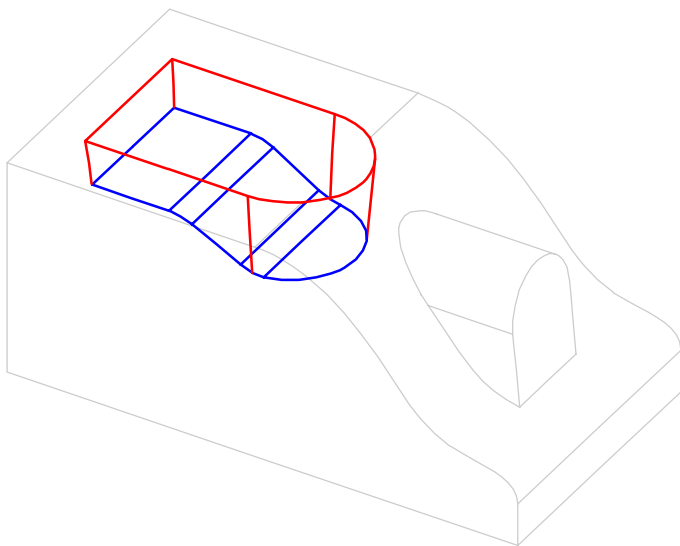
The toolpath follows the contours of the surfaces—staying in contact with both the drive and the part surfaces. You can view how the tool actually contacts the surfaces by picking the *Animate* icon. Also notice how the tool enters between the two points you defined earlier.

Recovery Point



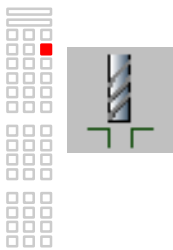
A collection of surfaces can contain multiple drive and part surfaces. To guide the tool properly, be sure to pick the seed surfaces close to each other.

In the next steps, you'll deselect the previously defined drive and part surfaces, and then pick multiple drive and part surfaces.





What: Create a drive/part operation.


How:




Operation Selection form

 *Category: Milling*

 *Type: Drive/Part*

 *Create*


 Don't close the Operation Specification form.

What: Name the operation. Then delete all the part and drive surfaces defined by the previous operation.

How:

Operation Specification form

Name: Machine pocket



Surface Selection form



Drive



Deselect All



Surface Selection form




Part



Deselect All



 Don't close the Surface Selection form.

What: Pick the drive surfaces composing the pocket.

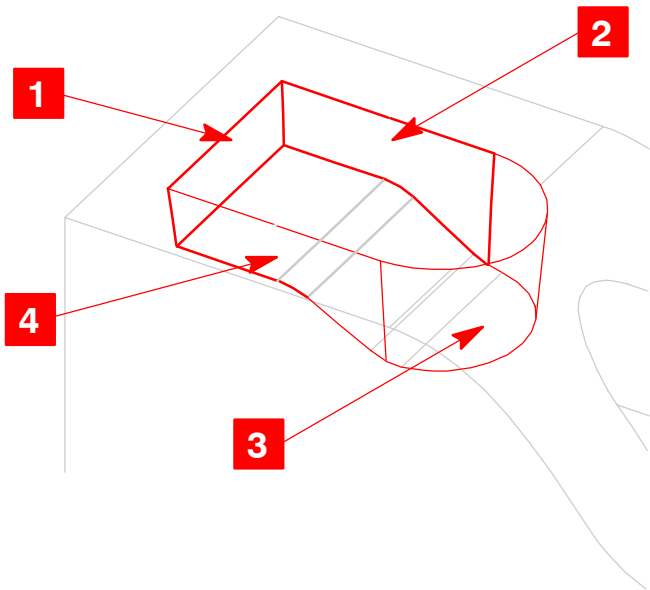
How:

Surface Selection form



Shift-pick the drive surfaces, F17, F18, F19, and F16.

- 1 F17
- 2 F18
- 3 F19
- 4 F16



A red circle with a diagonal slash through it, indicating a prohibition or warning.

Don't close the Surface Selection form.

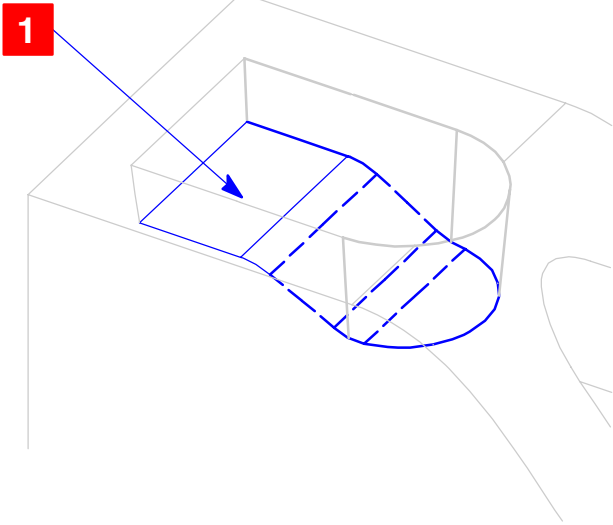
What: Pick the part surfaces composing the pocket.


How:

Surface Selection form



1 F10




 Don't close the Operation Specification form.


What: Specify the entry and exit parameters.


How:





Machining Parameters: Exit form


 *Exit Type: Ramp*

 *Retract Plane: 0.5*


 *Angle: 45*


 *Lift Angle: 60*


 *Exit...*





Machining Parameter: Entry form


 *Entry Type: Ramp*


 *Engage Plane: 0.5*

 *Angle: 270*

 *Sink Angle: 60*

 *Start Near: 1, 3, 0*

 *OK*

 Don't close the Operation Specification form.

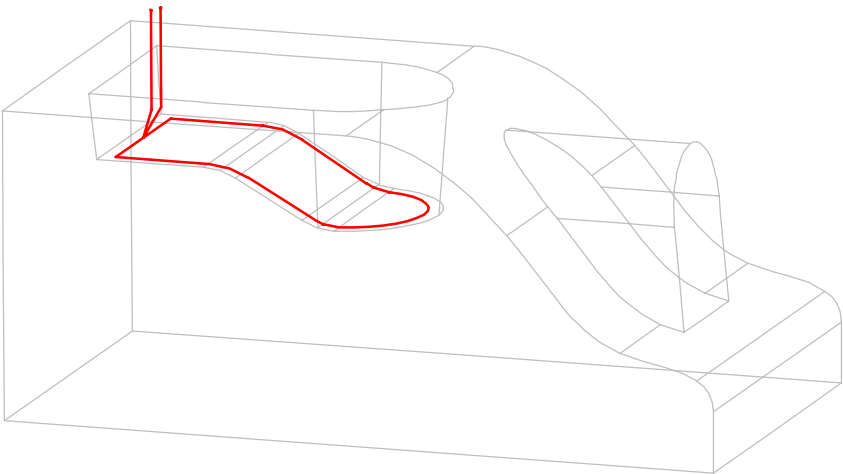
What: Create the toolpath.


How:

Operation Specification form



Recovery Point



 You can view where the tool contacts the part and drive surfaces by picking *Toolpath Attributes*, then toggling on *Part Contact* and *Drive Contact* on the Toolpath Display Options form.



Tutorial wrap-up

You've completed the Creating Drive/Part Operations tutorial.